



May 10, 2013

L-2013-156
10 CFR 50.73

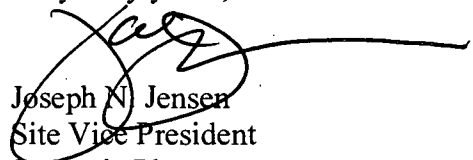
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: St. Lucie Unit 1
Docket No. 50-335
Reportable Event: 2013-001
Date of Event: March 12, 2013

Automatic Reactor Trip due to Failure of the 1B Main Steam Isolation Valve

The attached Licensee Event Report 2013-001 is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Very truly yours,


Joseph N. Jensen
Site Vice President
St. Lucie Plant

JJ/rcs
Attachment

JE22
NIRK

NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (10-2010)					APPROVED BY OMB: NO. 3150-0104 EXPIRES: 10/31/2013 Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects.resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.																																										
LICENSEE EVENT REPORT (LER)																																															
1. FACILITY NAME St. Lucie Unit 1					2. DOCKET NUMBER 05000335		3. PAGE 1 OF 3																																								
4. TITLE Automatic Reactor Trip due to Failure of the 1B Main Steam Isolation Valve																																															
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED																																						
MONTH	DAY	YEAR	YEAR	SEQUENTIA L NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME NA	DOCKET NUMBER																																					
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9. OPERATING MODE 1			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)																																												
10. POWER LEVEL 100%			<table style="width:100%; border: none;"> <tr> <td><input type="checkbox"/> 20.2201(b)</td> <td><input type="checkbox"/> 20.2203(a)(3)(i)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(C)</td> <td><input type="checkbox"/> 50.73(a)(2)(vii)</td> </tr> <tr> <td><input type="checkbox"/> 20.2201(d)</td> <td><input type="checkbox"/> 20.2203(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(1)</td> <td><input type="checkbox"/> 20.2203(a)(4)</td> <td><input type="checkbox"/> 50.73(a)(2)(ii)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(viii)(B)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(i)</td> <td><input type="checkbox"/> 50.36(c)(1)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(iii)</td> <td><input type="checkbox"/> 50.73(a)(2)(ix)(A)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(ii)</td> <td><input type="checkbox"/> 50.36(c)(1)(ii)(A)</td> <td><input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(x)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iii)</td> <td><input type="checkbox"/> 50.36(c)(2)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(A)</td> <td><input type="checkbox"/> 73.71(a)(4)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(iv)</td> <td><input type="checkbox"/> 50.46(a)(3)(ii)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(B)</td> <td><input type="checkbox"/> 73.71(a)(5)</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(v)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(A)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(C)</td> <td><input type="checkbox"/> OTHER</td> </tr> <tr> <td><input type="checkbox"/> 20.2203(a)(2)(vi)</td> <td><input type="checkbox"/> 50.73(a)(2)(i)(B)</td> <td><input type="checkbox"/> 50.73(a)(2)(v)(D)</td> <td colspan="2" style="text-align: right;">Specify in Abstract below or in NRC Form 366A</td> </tr> </table>								<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A	
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12. LICENSEE CONTACT FOR THIS LER																																															
NAME Richard Sciscente - Principal Engineer, Licensing								TELEPHONE NUMBER (Include Area Code) 772-467-7156																																							
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT																																															
CAUSE	SYSTEM	COMPONENT	MANU- FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU- FACTURE	REPORTABLE TO EPIX																																						
B	SB	ISV	S075	YES																																											
14. SUPPLEMENTAL REPORT EXPECTED <input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO						15. EXPECTED SUBMISSION DATE																																									
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) <p>On March 12, 2013 at 1451 EDT, St. Lucie Unit 1 was in Mode 1 at 100% reactor power when the spurious closure of HCV-08-1B, 1B Main Steam Isolation Valve (MSIV), resulted in an automatic reactor trip. Upon troubleshooting and valve disassembly, it was discovered that interference between the internal tail link and the valve body prevented the valve disc from fully opening. This allowed unintentional loading of internal parts resulting in the failure of the valve's lower shear pin. The pin failure led to spindle/disc separation and inadvertent closure of the valve.</p> <p>This reactor trip event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an automatic actuation of the reactor protection system (RPS). This event had no significant safety consequence since the RPS successfully performed its intended safety function upon the failure of the 1B MSIV.</p> <p>The internal interference was caused by an oversized tail link supplied by the valve manufacturer. To correct the problem, the tail link was reworked to eliminate the body interference, and the MSIV was reassembled.</p> <p>This event had no effect on the health and safety of the public.</p>																																															

LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
St. Lucie Unit 1	05000335	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	Page 2 of 3
		2013	- 001	- 00	

NARRATIVE

Description of the Event

On March 12, 2013 at 1451 EDT, St. Lucie Unit 1 was in Mode 1 at 100% reactor power when the spurious closure of HCV-08-1B, 1B Main Steam Isolation Valve (MSIV), resulted in an automatic reactor trip on Thermal Margin/Low Pressure (TM/LP). Upon troubleshooting and valve disassembly, it was discovered that interference between the internal tail link and the valve body prevented the valve disc from fully opening until the spindle was on the back seat. This allowed unintentional loading of internal parts resulting in the failure of the valve's lower shear pin. The pin failure led to spindle/disc separation and inadvertent closure of the valve.

Cause

A root cause evaluation determined that the internal interference was caused by an oversized tail link.

The dimensional nonconformance that caused interference with the valve body and prevented the valve from opening to the backseat was not identified during manufacturer certification or receipt inspection.

Analysis of the Event

The Unit 1 MSIVs, HCV-08-1A and HCV-08-1B, were upgraded as part of the recent extended power uprate (EPU) to ensure they could withstand impact stresses associated with spurious closures (no reverse flow) at the higher steam velocities of EPU conditions. This upgrade included replacing internal valve components with larger ones made of stronger materials and replacing the pneumatic actuator with an electro-hydraulic actuator. The Unit 1 MSIVs were originally manufactured by Schutte & Koerting (S&K). The replacement valve actuator is manufactured by Enertech. The new valve internal components replaced in SL1-24 were manufactured by Flowserve based on Kalsi Engineering analysis.

To resolve the interference contact of the tail link and valve body, metal was removed from the oversized tail link by grinding. Critical valve and internal dimensions and clearances were verified to be in accordance with design criteria. A thorough valve, piping, and support analysis was performed. This included evaluating reuse of the valve body and specific internal parts. It also included analysis of the piping and supports. Walkdowns of the piping and supports were performed both inside and outside of containment. Extensive inspections and non-destructive exams (NDE) were performed on the valve body, valve internals, and supports.

The 1A MSIV, HCV-08-1A, was also disassembled. An oversized tail link was also found. The tail link was contacting the valve body just like the 1B MSIV and would have initially prevented the valve from reaching the backseat. However, the spindle tab had partially torn allowing the valve to backseat. The partial tear prevented an in-service failure. The 1A MSIV tail link was reworked to eliminate the body interference and the spindle was replaced.

The spare tail link in stores was inspected, and dimensional checks confirmed it was also oversized. The spare tail link was reworked. The other installed MSIV parts were inspected, and no installation or other dimensional discrepancies were identified.

During post modification testing, stroke length measurements for HCV-08-1A and 1B did not meet the acceptance criterion defined by the work order instructions. This was an opportunity to identify a problem with internal interference in HCV-08-1B when the

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1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
St. Lucie Unit 1	05000335	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	Page 3 of 3
		2013	- 001	- 00	

NARRATIVE

limit switches could not be set as specified. The resulting actions focused on limit switch setpoint adjustment and limit switch mounting changes to address the condition.

Safety Significance

The Conditional Core Damage Probability (CCDP) and Conditional Large Early Release Probability (CLERP) values were evaluated for the stated event and were found to be significantly below the thresholds required by RG-1.174 for the risk to be "Small" where CCDP is below 1.0E-06 and CLERP is below 1.0E-07. Given the response of the plant and the insignificant CCDP and CLERP values, the health and safety of the public were not affected by this event.

This reactor trip event is reportable pursuant to 10 CFR 50.73(a)(2)(iv)(A) as an automatic actuation of the reactor protection system (RPS). This event had no significant safety consequence since the Reactor Protection System successfully performed its intended safety function upon the failure of the 1B Main Steam Isolation Valve.

Corrective Actions

The corrective actions listed below are entered into the site corrective action program. Any changes to the actions will be managed under the corrective action program.

1. The tail links (including the spare) were reworked and full spindle travel to the back seat were verified for HCV-08-1A and HCV-08-1B.
2. The Station will revise the maintenance procedure (and associated vendor manual) for Main Steam Isolation Valve disassembly, inspection, repair and reassembly to include steps to ensure that the valve opens completely until the spindle is on the back seat. This will also include a caution that the H-Link pins can be overloaded by the actuator if the valve does not open to the back seat.

Similar Events

A search of the corrective action database was performed and identified no similar issues that were related to the valve failures in this report.

Failed Component(s)

Main Steam isolation Valve

Manufacturer

The Unit 1 MSIVs were originally manufactured by Schutte & Koerting (S&K).

The replacement valve actuator is manufactured by Enertech.

The new valve internal components replaced in SL1-24 were manufactured by Flowserve based on Kalsi Engineering analysis.